REMARKS

The Office Action objected to the drawings for including a spelling error in FIG. 5. Attached is a replacement sheet that corrects the spelling error by changing the word "structer" to "structure" in box 508 of FIG. 5.

The specification was objected to for including a spelling error on page 13, line 20. With the present amendment, this spelling error has been corrected.

Claim 2 was objected to for including the phrase "one recognition value of in the new phrase." With the present amendment, claim 2 has been amended to remove the preposition "of." Claim 8 was objected to for including a spelling error on line 2 in which the singular "instruction" was used instead of the plural "instructions." With the present amendment, this spelling error has been corrected.

Claims 1-3 and 12-15 were rejected under 35 U.S.C. §103(a) as being unpatentable over Hutchins (U.S. Patent 4,994,966), in view of Zamora et al. (U.S. Patent 4,887,212, hereinafter Zamora).

Neither Hutchins nor Zamora show or suggest the invention of claims 1-3 and 12 because neither reference shows or suggests receiving at least one instruction to add a new phrase and semantic information associated with the new phrase to a recognition grammar as found in claim 1. In the Office Action, column 8, lines 19-47 of Hutchins were cited as showing a step of receiving an instruction to add a phrase and semantic information to a grammar. Applicants respectfully dispute this assertion.

In the cited section, Hutchins describes performing a syntactic parse of a sentence. This parse is performed by advancing a "grammar path" in response to syntactical tag input from a dictionary module for words in a sentence. Thus, the grammar path is formed by combining parts of speech to form larger syntactic phrases such as noun phrases and verb phrases. The

construction of these phrases results in a syntactic parse of the sentence indicating the syntactic role of the individual words in these sentences. This grammar path is not a recognition grammar as found in claim 1 of the present application.

As indicated by the specification of the present application, a recognition grammar of the present invention is used by a recognition system to limit the valid recognition hypotheses that can be generated from an input. The "grammar path" of Hutchins, on the other hand, is a syntactic parse structure that indicates the syntactic content of a sentence. Such a syntactic parse structure does not limit the valid recognition hypotheses that can be generated from an input and as such cannot be considered to be a recognition grammar.

In addition, since the "grammar path" of Hutchins is actually a syntactic parse structure, there is no means for adding *semantic* information to the "grammar path." As shown in the present specification, a recognition grammar as found in claim 1 can have semantic information added to it by associating the semantic information with particular recognition values in the grammar. Neither Hutchins nor Zamora show or suggest adding semantic information to a recognition grammar. Instead, both are directed to constructing syntactic parse structures from input sentences and make no mention of semantic information.

Since neither Hutchins nor Zamora show or suggest adding semantic information associated with a new phrase to a recognition grammar, their combination does not show or suggest the invention of claims 1-3 and 12.

The combination of Hutchins and Zamora also does not show or suggest the invention of claims 13-15. In claim 13, a grammar structure building component, which forms part of a speech recognition interface for a speech recognition engine, receives instructions to add transitions to a grammar structure and in response adds such transitions to the grammar structure.

Neither Hutchins nor Zamora show a grammar building component that forms part of a speech recognition interface. Both of these references are syntactic parsers and neither of them mentions forming a grammar for speech recognition.

Further, neither of these references shows a step of adding a transition to a grammar structure or placing semantic information associated with a current sequence of transitions on a first transition in the grammar structure that differentiates the current sequence of transitions from all other sequences of transitions in the grammar structure.

Since Hutchins and Zamora lack nearly every limitation of claim 13, claims 13-15 are patentable over Hutchins and Zamora.

In addition, in regards to claim 14, neither Hutchins nor Zamora show or suggest adding transitions to the grammar structure by only adding a new transition if there are no existing transitions in the grammar structure that both extend from the same state as the new transition and have the same recognition value as the new transition. Neither reference makes any determination of whether there is an existing transition in a grammar structure that extends from a same state as a new transition and has the same recognition value as the new transition. In fact, neither Hutchins nor Zamora show or suggest a grammar consisting of recognition values.

With regards to claim 15, neither Hutchins nor Zamora show or suggest moving semantic information that is associated with at least one sequence of transitions other than the current sequence of transitions to avoid semantic ambiguity.

Claims 4-11 and 16-18 were rejected under 35 U.S.C. §103(a) as being unpatentable over Hutchins in view of Zamora and further in view of Horiguchi et al. (U.S. Patent 6,282,507, hereinafter Horiguchi). With regards to claims 4 and 16, the Office Action asserted that Horiguchi shows the step of identifying existing semantic information that was present in a

grammar structure before a new phrase was added and shifting the existing semantic information within the grammar structure at FIG. 26 and column 27, line 27 to column 28, line 30. Applicants respectfully dispute this assertion.

The cited section of Horiguchi describes steps for parsing a sentence by putting words in the input string on a stack, and then executing rules to combine words found in the stack. As words are combined, they form new nodes that are placed in the stack for combination using other rules. The cited section includes reference to a "shift action" that shifts onto a stack of the parser the next word of the input string. Horiguchi does not identify existing semantic information that was present in a grammar structure before a new phrase was added. In fact, Horiguchi makes no mention of identifying semantic information at all.

In addition, Horiguchi does not shift existing semantic information within the grammar structures so that the existing semantic information is not found on a recognition value found in a new phrase. As shown in columns 27 and 28, Horiguchi only performs a shift operation to place a *word* on a stack. It makes no mention of shifting *semantic information* within a grammar structure.

Regarding claims 6 and 7, the Office Action asserted that Horiguchi includes instructions for providing a grammar structure to a speech recognition engine, receiving an indication of a hypothesis word recognized by the speech recognition engine and providing semantic information associated with the hypothesis word to an application. In particular, FIG. 2 element 222 and element 224 as well as FIG. 12 were cited to support this rejection.

Although FIG. 2 of Horiguchi does show a speech recognition module comprising a speech recognition unit 222 and a hypothesis construction unit 224, it does not show or suggest that

a grammar is provided to the speech recognition engine. Further, Horiguchi makes no mention of providing semantic information associated with a hypothesis word to an application. In particular, FIG. 12 does not show this aspect of the invention. Instead, FIG. 12 only shows the construction of a best utterance hypothesis that is provided to a translation component. The translation component translates the best utterance hypothesis into another language and a speech synthesis component then provides a speech signal in the other language thereby providing a translation of the input speech signal. There is no mention of semantic information associated with a hypothesis word being provided to an application as found in claim 6. As such, claims 6 and 7 are patentable over the combination of Hutchins, Zamora and Horiguchi.

With regards to claims 8-11, none of Hutchins, Zamora or Horiguchi discloses a step of deciding whether to take an action before complete recognition of a phrase based on semantic information provided to an application with a hypothesis word. Since none of the references show or suggest providing semantic information with a hypothesis word, none of them can show or suggest deciding whether to take an action before complete recognition of a phrase based on semantic information provided with a hypothesis word. FIG. 26 of Horiguchi in particular does not show or suggest this aspect of the invention, because it makes no suggestion for providing semantic information with a hypothesis word or taking action based on such semantic information before recognition of a phrase has been completed. As such, claims 8-11 are additionally patentable over Hutchins, Zamora and Horiguchi.

With regards to claim 18, none of Hutchins, Zamora and Horiguchi show or suggest moving semantic information by associating the semantic information with each transition that extends from a same state as a transition that differentiates a current sequence of transitions from all other transitions. In

particular, Horiguchi makes no reference to transitions that extend from a same state as a transition that differentiates a current sequence of transitions from all other transitions. In addition, Horiguchi makes no suggestion for moving semantic information. As such, the combination of Hutchins, Zamora and Horiguchi does not show or suggest the invention of claim 18.

Claims 19 and 20 were rejected under 35 U.S.C. §103(a) as being unpatentable over Hutchins in view of Zamora, Chang et al. (U.S. Patent 6,745,181, hereinafter Chang) and Horiguchi.

Claims 19 and 20 are not shown or suggested in this combination of references. In particular, none of the cited references show or suggest a context free grammar engine that receives a compiled representation of a grammar structure and that provides the grammar structure to a speech recognition engine.

In the Office Action, FIG. 25, column 27 and FIG. 2 of Horiguchi were cited as showing a context free grammar engine that receives a compiled grammar and provides the grammar structure to a speech recognition engine. However the cited sections of Horiguchi make no mention of a context free grammar engine that provides a grammar structure to a speech recognition engine. Instead, FIG. 25 of Horiguchi only shows a compiled F-structure function and a GLR parsing engine. It makes no mention of a grammar structure being provided to a speech recognition engine. Although FIG. 2 of Horiguchi shows a speech recognition system, it does not show a context free grammar engine that provides a grammar structure to the speech recognition engine.

Since none of the references show or suggest providing a grammar structure to a speech recognition engine, the combination of references does not render claims 19 and 20 obvious.

Claims 21-24 were rejected under 35 U.S.C. §103(a) as being unpatentable over Marx et al. (U.S. Patent 6,173,266,

hereinafter Marx) in view of Schwartz et al. (U.S. Patent 5,621,859, hereinafter Schwartz).

Claims 21-24 are not shown or suggested in the combination of Marx and Schwartz because Marx and Schwartz do not show or suggest the step of determining whether to take an action identified from semantic information associated with a hypothesis word before an entire utterance has been recognized.

In the Office Action, the abstract, column 8, lines 64-67 and column 9, lines 25-32 of Schwartz were cited as showing a step of taking an action identified from semantic information before an entire utterance has been recognized. Applicants respectfully dispute this assertion.

The cited sections make no mention of taking an action that is identified from semantic information. Further, the cited sections make no mention of taking such an action before an entire utterance has been recognized. Instead, the cited sections merely discuss using phonetic context information and statistical grammar information as soon as possible while searching a phonetic tree. There is no mention of determining whether to take an action before an entire utterance has been recognized and there is no mention of taking an action that was identified based on semantic information associated with a hypothesis word.

Since neither Schwartz nor Marx show or suggest determining whether to take an action that has been identified from semantic information before an entire utterance has been recognized, their combination does not show or suggest the invention of claims 21-24.

Conclusion

In light of the above remarks, claims 1-24 are patentable over the cited art. Reconsideration and allowance of these claims is respectfully requested.

The Director is authorized to charge any fee deficiency required by this paper or credit any overpayment to Deposit Account No. 23-1123.

Respectfully submitted,

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